

Non-gravitational Effects on Genus Penicillium

**MacKenzie Loup
Newell High School**

Abstract

In September 1994, Shuttle Orbiter Discovery, STS-64, launched into space. Aboard that shuttle was a payload containing Fungi spores, genus Penicillium.

With the over looking help of Dr. Audrey Gabel, Associate Professor of Biology at Black Hills State University, investigations on differing media types began. Basis for this experimentation was to determine if there was any differences between the space exposed spores and control spores. Studies concluded that there were differences and those differences were then recorded. It was hypothesized the spores may have been effected causing differences in growth rate, colony size, depth and margins, coloring, germination, and growth on different media.

Introduction

In 1928 Alexander Fleming discovered a strain of fungi that would eat away at the edges of bacteria. In 1929 it was given the name penicillin. This fungi would later be used to make thousands of vaccines for infectious diseases. Since Flemings' work in 1928 hundreds of different antibiotics have been discovered. Two well known scientists, Charles Thom and Thomas Raper, have continued studying strains of fungi. Their work in 1957 was the most recent studies since.

The present studies of space of exposed penicillin involve three various agars and a laboratory environment. The products of this experiment could be of great value to drug companies, people in the medical field, and animal husbandry.

The research studies involved three agars, potato dextrose, sodium acetate, and czapeks. Potato dextrose agar is a extremely starchy agar and most all penicillins grow very well on it. The sodium acetate agar is very acidic and few strains of the investigated fungi grow on it. The czapeks agar contains salt and growing capability depends on the strain of penicillin.

Test Specimens

The specimens used were obtained from Dr. Gabel on June 21, 1994. They were exposed to external atmospheric conditions for eleven days beginning on September 9, 1994 and ending on September 20, 1994. The fungi were placed in a GAS can and flown aboard the Shuttle Orbiter Discovery, STS-64. The flight environment is unknown.

Test Environment

All laboratory work was done at Black Hills State University. The inoculation, growing, and germination temperature for the media plates was room temperature. Observations were made daily and the data recorded.

Final Results

In January 1995, experimental processes began. I inoculated various media types prepared using standard agar recipes. I observed specimen under a compound microscope and recorded data for each part of the experiment. After about three weeks I recorded my final results. The colonies and

shape of two different groups varied as did the growth rate for the czapeks and the potato dextrose agars. The space exposed spores grew slower than the control group. Studies were made and recorded that the potato dextrose agar plates did not differ significantly. Studies also concluded that differences occurred among the czapeks medias. Control colonies for the czapeks grew faster showing brilliant coloration. Space specimens lagged behind control studies by approximately twelve hours.

Although not many differences were found in the plates of media, there were tremendous differences in the germination studies. The germination tubes on space exposed spore were narrow and longer while the control spores were shorter and thicker.

References

1. Brock, Thomas D., *Biology of Microorganisms*, Edition two, 1974.
2. Chan, E.C.S., Noel Krieg, and Michael J. Pelczar, Jr., *Microbiology*, 1986.
3. Gabel, Dr. Audrey, Associate Professor of Biology at Black Hills State University, June 23, 1994 - March, 1995.
4. Jeon, Kwang W., *Intentional Review of Cytology: A Survey of Cell Biology*, Vol. 156, 1994.
5. Raper, Kenneth B., and Charles Thom, *A Manual of the Penicillia*, 1949.
6. Sakaguchi, Kin-Ichiro, *Atlas of Micro-organisms/The Penicillia*, 1957.